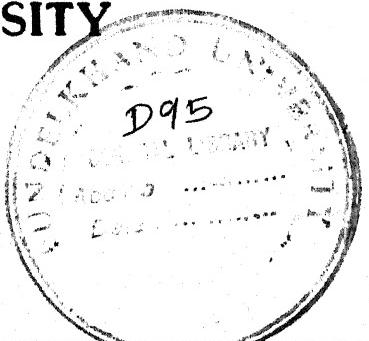


**COMPARISON OF VARIOUS  
CONCENTRATIONS OF CARBOLIC ACID  
AS SCLEROTHERAPEUTIC AGENT  
FOR HYDROGEL**

**THESIS  
FOR  
MASTER OF SURGERY  
( GENERAL SURGERY )**



**BUNDELKHAND UNIVERSITY  
JHANSI (U. P.)**



DEPARTMENT OF GENERAL SURGERY  
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C E R T I F I C A T E

This is to certify that the work entitled "COMPARISON OF VARIOUS CONCENTRATIONS OF CARBOLIC ACID AS SCLEROTHERAPEUTIC AGENT FOR HYDROCELE" which is being submitted as Thesis for M.S. (General Surgery) examination, 1989 of Bunelkhand University, Jhansi by Dr. Arun Kumar Chaubey has been carried out under my direct guidance and supervision. His results and observations have been checked and verified by me from time to time.

He has put the necessary stay in the department of General Surgery as per University regulations.

Dated: 10th September, 1988.

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### A C K N O W L E D G E M E N T

My vocabulary fails when it comes to express my gratitude to all those who helped me in building up this thesis to its present status.

My heart is throbbing with profound sense of gratitude to my learned and most esteemed teacher Dr.S.L. Agarwal, M.S.,F.R.C.S., Professor & Head, Department of General Surgery, M.L.B. Medical College, Hospital, Jhansi, whose canny precision, deep enthusiasm, elegant endeavour, ingenious efforts for the completion of this present work, shall ennals of my life as indelible event. His able guidance, constructive and valuable suggestions, criticism and meticulous attention have gone a long way towards the success of this work.

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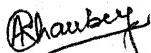
I find myself lacking when it comes to choose adequate words to express my gratitude to Dr.R.P.Kala, M.S., Reader, Department of General Surgery, M.L.B. Medical College, Hospital, Jhansi, Dr. Mohan Singh, M.S., Senior Lecturer. I am highly obliged for their great support and helpful suggestions from time to time.

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In last but not the least I express my gratitude to my parents, my friends Dr. K.K.Sharma and Dr.Upma Sharma and my nice Chinty, whose love, affections, and moral support to perform this work thoroughly.

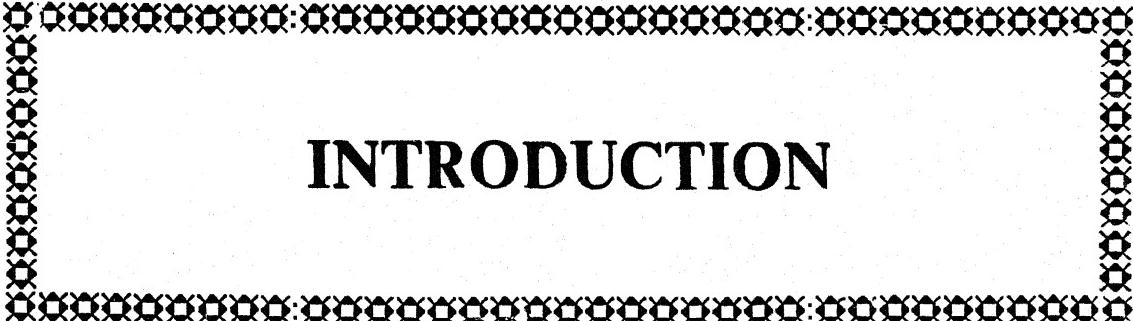
Mr. B.P.Tiwari deserves a special note of thanks for painstaking job of converting the manu-script to transcript.

  
(Arun Kumar Chaubey)

## C O N T E N T S

	<u>PAGE No.</u>
INTRODUCTION .. . . . .	1-4
REVIEW OF LITERATURE .. . . . .	5-11
MATERIAL & METHODS. . . . .	12-17
OBSERVATIONS .. . . . .	18-23
DISCUSSION .. . . . .	24-28
CONCLUSION & SUMMARY .. . . . .	29-30
BIBLIOGRAPHY .. . . . .	31-33

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# **INTRODUCTION**

## I N T R O D U C T I O N

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Scrotal hydrocele is a common problem affecting all age groups. In tropical countries scrotal hydrocele is of more frequent occurrence than in temperate climates. Such hydroceles are often very large, sometimes bilateral as noted by Burkitt (1951), Burkitt and Willmore (1964) and Davey (1968).

The condition is not life-threatening, the symptoms are usually those of inconvenience or embarrassment. Recent text books recommend either repeated aspiration or surgery as the only two acceptable method of treatment (Pender, 1973), Khitaker (1976), Rains and Ritchie (1977). Aspiration alone is not curative and will need to be repeated at least every three months. The latter method has a high incidence of complications (Moloney, 1975). These, however, can be minimised by careful surgery (Lord, 1964, 1978). Surgery is generally thought to be the most effective treatment of hydrocele (Landes and Leonhardt, 1967). Various surgical procedures have been discovered for treating hydrocele, based on their nature e.g.

- Eversion of sac (Jaboulay's operation).
- Plication of sac (Lord's operation).

- Excision of sac.
- Sharma and Jhawer's minimal dissection.
- Technique.
- Wilkinson's operation.
- Extrusion operations without sac excision or plication (Solomon, 1955).
- Suturing the sac to the epididymis (Gower & Howley, 1962).
- Andrew's bottle operation etc.

Most surgeons are confident that their method of surgical treatment is without mortality or morbidity but a critical review of the post-operative course usually reveals an unacceptably high incidence of the notorious swelling and induration, haematoma and infection. As a result the average hospital stay gets prolonged and leads to a loss of many man-hours of work.

Injection treatment or sclerotherapy in various forms has been used since the thirteenth century (Lands and Leonhardt, 1967). Wilkinson of Saliceto was reported to have inserted sugar and ginger into the hydrocele sac after allowing the fluid to escape through a cannula. Since then a number of other agents have been used including :-

Sublimate of mercury.

Pert.

Brandy.

Tincture of iodine.

Phenol

Quinine and urethane

Tetracycline

Sodium tetradeccyl sulphate (Safrodecol).

But this form of therapy was largely abandoned, probably on poor evidence (B.M.J., 1973).

The reason for the fall from grace of sclerotherapy in the earlier part of this century is unclear. There are no reports listing horrific complications or even reports showing poor results. The evidence appears to be anecdotal as so clearly demonstrated in the answer to an "Any Questions" which appeared in the British Medical Journal in 1973. In responding to a question about the type and amount of fluid recommended for injection of hydroceles it was stated that a "Canvas of opinion amongst urologists elicited only derision and a series of unpublishable anecdotes". Over the last eight years partly in response to this rather unsatisfactory answer many scientists have undertaken clinical studies on the efficacy of phenol sclerotherapy (Nash, JR, 1980).

Meloney's recent report demonstrated that sclerotherapy could be an effective form of treatment for hydrocele.

The role of tetracycline (Achromycin) as an sclerosant for treating hydrocele without any complication

and recurrence after one year follow up has been described by Robert Kay (1982). The similar agent has been used by Dr. Richard Baumer in many patients with very satisfactory results.

Recent reports of good results with sclerotherapy (Gupta RC, Kala PC, I.J.S., 1983) have prompted us to conduct a study on the role of sclerotherapy in the cure of primary hydrocele.

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## **REVIEW OF LITRATURE**

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## REVIEW OF LITERATURE

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There are various methods for the treatment of hydrocele. The standard treatment of hydrocele described in many modern text books is either repeated aspiration or operation (Pender, 1973; Khitaker, 1976).

Tapping by Trocar and Cannula is an abandoned technique as by this procedure the patient can be made content of cure of his ailment for few weeks only. The sac again refills. Repeated tapping is liable to be followed by a little oozing into the sac. It may lead to transmission of infection leading to formation of haematocoele and pyocele - for which the patient may be required to undergo orchietomy.

No one, now-a-days, practices this obsolete method. Surgical correction of hydrocele is the most reliable method as it is based on the correction of the process leading to the formation of hydrocele fluid (Lands and Leonhardt, 1967). The various etiological factors which have been predicted for the formation of hydrocele are -

- a. Excessive production of fluid within the sac.
- b. Defective absorption of hydrocele fluid by the tunica vaginalis.

- c. Interference with the drainage of fluid by the lymphatic vessels of the cord.
- d. By connection with the peritoneal cavity as in congenital variety. Though surgical treatment of hydrocele is a fool proof technique, it has a high incidence of complications ( Moloney, 1975). Careful aseptic surgery can, however, minimise the complications (Lord, 1968).

Surgery is the treatment of choice in congenital and infantile hydrocele; in fit patients under 40 years of age; in cases suspected of having a testicular tumour and those with hydrocele greater than 500 ml (Nash JR, 1979).

Various surgical procedures have been discovered for treating hydrocele based on their nature viz.

- i) Eversion of sac - Jaboulay's operation.  
Jaboulay (1982), Berand (1825).
- ii) Plication of sac - Lord's operation (Lord PH, 1956).
- iii) Sharma and Jhawer's minimum dissection technique.
- iv) Wilkinson's operation.
- v) Excision of sac.
- vi) Extrusion operation without sac excision or plication (Solomon, 1950).

vii) Andrews' (1967) bottles operation.

The basic principles of all these operations are one and the same. The tunica vaginalis which is supposed to be secretary as well as the absorptive layer comes in contact of the subcutaneous tissue which hinders the formation but more so actively absorbs the hydrocele fluid secreted by the tunica. Thus the basic defects of excessive production and defective absorption get corrected.

In congenital hydrocele, where there is a patent processus vaginalis communicating with the peritoneal cavity - the sac is ligated at neck and then excised. The surgery is the only answer in such cases for complete relief.

All the above surgical procedures are not only associated with complications like post operative reactionary oedema, haematoma or infection but also require prolonged hospital stay and lead to a loss of man-hours of work.

Sclerotherapy can be an effective alternative in such cases. All these patients refused operation on the ground of ill health should be treated with sclerotherapy and for the remainder sclerotherapy is recommended but operation could be offered as an alternative (Nash JR, 1979).

The debate about the effectiveness of a particular form of treatment is not new, it goes back many centuries. Injection treatment or sclerotherapy in various forms has been used since the thirteenth century (Lands and Leohardt, 1967), Willimms of Saliceto was reported to have inserted sugar and ginger into the hydrocele after allowing the fluid to escape through a cannula. Since then a number of agents have been used including -

1. Prostwine used at Cuy's hospital in the 18th century.
2. Brandy.
3. Tincture of iodine.
4. Phenol
5. Quinine and urethane.
6. Sodium tetradecyl sulphate (Wilson W. and Lacet, 1948).

This type of therapy is based on the principle that the sclerosant in dilute form will damage the mucosa of tunica vaginalis, parietal as well as visceral layer, thus hindering the process of excessive formation of hydrocele fluid from the tunica.

The reason for the fall from favour of sclerotherapy in the earlier part of this century is unclear. There are no reports listing horrific complications or even reports showing poor results.

Moloney used a mixture of -

1.5% phenol in water

2.5% glucose.

3.5% glycerine.

as a sclerosant for treating small and medium sized hydroceles. He made a comparison of results between a series of hydroceles treated by surgery with a complication rate of at least 17% haematoma and 10% sepsis, an average hospital stay of 5 days and a much longer time off work and a series treated by tapping and injections requiring 1-3 visits to O.P.D., an almost negligible complication rate and no failure in those completing treatment. In a series of 100 cases, treated in 20 years using 2.5% phenol only, he found haematoma in 2 cases only (0.2%) and sepsis in a 1 case (0.1%).

In another series of 80 cases treated with sclerotherapy as an O.P.D. procedure by Gupta and Kala (I.J.S., 1983), the failure rate was 5%, 15% patients had mild testicular pain during injection and 4% patients had persistent testicular pain and tenderness for some time. However, 20 cases had haematoma or infection. A slight thickening of tunica vaginalis occurred in 22.5% cases as a late effect but this was painless.

Recurrence was found in 5% cases.

Nodular testicle with blood stained fluid sometimes, is found following sclerotherapy (Moloney, 1975).

Nash (1979) in a series of 56 cases of hydrocele treated by sclerotherapy ( 2.5% phenol in water) found a 98% cure rate within an average followup of 18 months.

Nash (1984) in a series of 70 cases followed for a period of 5 years - found an early recurrence in 3 cases which were retreated early and did not recure at the 5 years review. The testicular pain after the injection of the 2.5% phenol was mild which was avoided by injecting a small quantity of local anaesthetic agent into the sac before injecting phenol. None of the complications resulted in hospital admission. Residual testicular thickening after treatment of large hydroceles was not surprising in view of the size of tunica vaginalis. This report of Nash (1984) helped in unfurling the fact that no recurrence will result any time after the sclerotherapy. This suggests sclerotherapy a highly effective, safe and cheap mode of treatment of hydrocele. Sclerotherapy thus should be considered for treatment of hydrocele in adults and should be regarded as the treatment of choice in the elderly (Nash, 1984).

Macfarlane (1983) using a different sclerosant reported equally good results.

Robert Kaye used another sclerosant (diluted tetracycline - Achromycin) in few cases. In a 61 years old patient with hydrocele containing 400 ml of fluid he injected 450 mg of achromycine diluted to a volume of 5 ml in sterile water after tapping the hydrocele fluid with proper aseptic condition. No further fluid accumulation was evident and after 1 year of follow up there had been no recurrence.

Another series of cases of hydrocele treated by tetracycline sclerotherapy has been published in New England Journal of Medicine with a 100% cure rate (Kaye and Baemer, 1952).

Sclerotherapy inspite of being a very good method of treating hydrocele has certain limitations. The cases selected should be free from any scrotal or testicular disease. It is not indicated in patients with ipsilateral hernia, in congenital or infantile hydrocele as the sclerosant will enter the peritoneal cavity and will cause chemical peritonitis.

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## **MATERIAL & METHODS**

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## MATERIAL AND METHODS

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Patients attending surgery O.P.D. at M.L.B. Medical College, Hospital, Jhansi seeking treatment of hydrocele from June 1987 to May, 1988 were selected for sclerotherapy. In our study sclerotherapy was performed in only those cases of hydroceles who were found to fulfil the following critaria not having

- any local sepsis
- Gonococcal epididymo orchitis
- Filarial lymphangitis
- Grossly thickened or calcified tunica vaginalis.
- Sac filled with semisolid debris associated with testicular degeneration.
- Malignancy of scrotum or testis.

Patients of younger age group (infants & children), patients having inguinal hernia and persistant proculus vaginalis were also excluded from the study.

Thus only those cases of primary vaginal hydrocele with age group between 20 - 70 years, not willing for surgery due to ill health or fear of long time off work were selected for sclerotherapy.

All the cases undergoing sclerotherapy were enlisted in a register for assessing the result after subsequent follow up.

Clinical findings were noted in details.

viz -

- H/O Trauma
- Translucency
- Scrotal or inguinoscrotal swelling.
- Tenderness
- Fluctuation
- Local temperature etc.

Patients included in our study were categorized in various groups depending upon their age, size of hydrocele, concentration and amount of sclerosant (carbolic acid) used for the treatment.

Table 1

Group I	:	20 - 40 years
II	:	41 - 60 years
III	:	7 60 years

Table 2

Percentage of sclerosant used (Carbolic acid in .9% N/S).

Group I	:	2.5%
II	:	5%
III	:	7.0%

The maximum concentration, we used in our study was 7% aqueous phenol.

Table 3

Group I	:	100 - 200 ml
II	:	200 - 400 ml
III	:	7 400 ml

In cases of biletal hydroceles both sides were treated at the same time.

Hydrocele fluid was sent for cyto-biochemical examination before injecting the sclerosant.

Few cases with recurrance were operated and biopsy was taken from tunica, and testis so as to assess the effect of sclerosant on their structure.

#### SCLEROSANT

Carbolic acid diluted in isotonic normal saline was used as an sclerosant in our study. Carbolic acid (phenol) consists of colourless crystals with aromatic odour. It is soluble in water. It is available in dark glass bottles and remain in the form of crystals at room temperature, so bottle is warmed to liquify the phenol, the liquified phenol is then dissolved in normal saline bottle aseptically so as to get definitive known dilution.

Carbolic acid is an irritating substance. It denatures the protein when applied directly over the skin, a white pellicle of precipitated protein is formed, this soon turns red and eventually solughs out having a cutaneous surface stained light brown. If it remains in contact with skin it penetrates deeply and may cause extensive necrosis. Proteins of mucous membranes get coagulated as they come in contact with phenol, the mucous membrane gets thickened and submucosal tissue gets fibrosed as phenol penetrates

the mucosa. Phenol destroys the secretory and absorptive power of the mucosa and this quality of phenol is taken advantage of in treatment of hydrocele with the use of sclerosant solution.

In this study we first used 2.5% phenol in few cases but as re-accumulation appeared soon we switched on to certain higher strength of phenol soln. e.g. 5% and 7% in other cases.

#### METHOD

The patients desiring sclerotherapy for the treatment of hydrocele were shifted to minor operation theatre.

The part was prepared, thoroughly cleansed with soap & water and then painted with savlon, Betadine (Povidone iodine) and then draped with sterile sheets.

#### Anaesthesia

2% lignocaine was injected locally in hydrocele sac.

#### Site of injection

After fixing the sac, at the upper border of hydrocele, local anaesthesia was given and then 14-16 G van-floan cannula was inserted in the sac through anaesthetized area and all the fluid was drained out.

The lowest point of scrotum was never used for tap & injection because of the possibility of seepage of sclerosant by gravity into cellular tissues causing pain & discomfort.

The fluid was fully aspirated and the volume recorded after which the testicle was carefully palpated to ensure complete emptying, and noting any pathology.

The sclerosant used in our study was phenol in normal saline of varying concentrations.

The volume of sclerosant injected depended on the volume of aspirate. The volume of sclerosant was 10% of upto 300 ml. Above 300 ml, 35 ml of sclerosant was used for any size.

Amount of sclerosant used	Amount of hydrocele fluid aspirated
10 ml	100 ml
15 ml	150 ml
20 ml	200 ml
25 ml	250 ml
35 ml	7/ 350 ml

The punctured site was sealed by tincture benjamin and a scrotal bandage was given to be removed next day.

In the beginning patients were admitted in the ward and kept for observation to see the effect of increasing

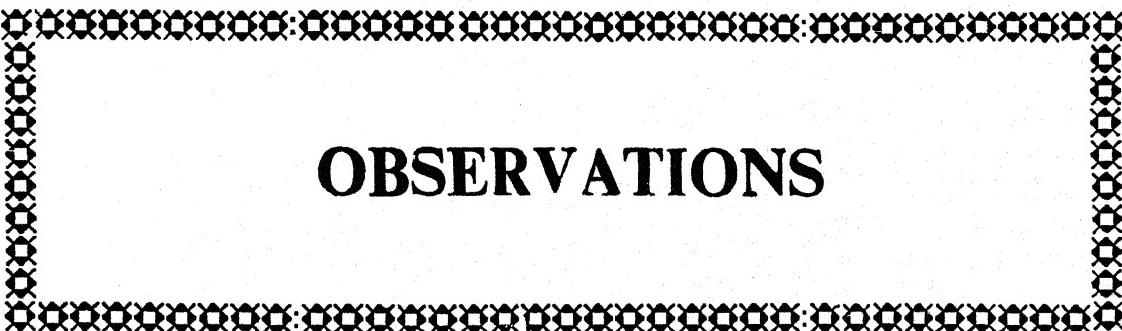
concentration of carbolic acid. Fortunately no harmful effect was observed in any case. Then gradually concentration of carbolic acid was raised to 7%. Even with this concentration no harmful effect was seen in any patient. No antibiotics, or anti inflammatory drug was given.

The patients were warned regarding some reaccumulation of fluid and they were asked to come for follow up at 3 weeks & 4 months.

If the size of scrotum suggested reaccumulation of fluid at the follow up at 4 months, the fluid was aspirated again and the second dose of sclerosant solution injected as before.

Usually the aspirate was darker than on the first visit and the fluid volume was much less.

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## OBSERVATIONS

## O B S E R V A T I O N S

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Sclerotherapy for hydrocele was done in 124 patients of different age groups who attended the surgical O.P.D. of M.L.B. Medical College, Hospital, Jhansi from June 1987 to May, 1988.

In the beginning patients were admitted in the hospital and kept under observation to see the effect of increasing concentration of carbolic acid. Fortunately no harmful effect (Carbolic acid toxicity) was observed in any case. Gradually the concentration of carbolic acid was raised to 7%. Even with this concentration, no harmful effect was observed in any patient. After this assessment, patients were discharged immediately after sclerotherapy.

The stay of patients in hospital in the beginning was 1-3 days.

Table 1

Showing age distribution of patients of hydrocele.

Sl.No.	Age group	No.of patients	Percentage
1.	16-25	31	25.00
2.	26-35	50	40.62
3.	36-45	27	21.87
4.	46-55	12	9.37
5.	755	4	3.14

The table shows that maximum number of patients who underwent sclerotherapy was in age groups 26-35 years and constituted 40.62% and the minimum number in age group above 55 years i.e. 3.14% only.

Table 2

Showing causative factor of disease.

Sl.No.	Causative factors	No.of patients	Percentage
1.	Idiopathic	98	79.03
2.	Trauma	26	20.97

The table 2 shows that majority of the patients i.e. 79.03% did not have any obvious cause of development of hydrocele. 20.97% patients only, gave the positive history of trauma like cycling, riding or blow of any type over scrotal region.

Table 3

Showing concentration of carbolic acid used.

Sl.No.	Percentage of strength of sclerosant	No.of cases	Percentage
1.	2.5%	14	11.20
2.	5%	26	20.90
3.	7%	84	67.70

The table 3 shows that 7% carbolic acid in normal saline was used in the treatment of maximum (67.7%) of cases, as this concentration showed good results, least complications and above all less chance of recurrence. With higher concentration however many patients complained of thickening and hardening of scrotum. These patients were assured that this thickening and hardening will disappear after few weeks. Few patients out of them underwent operation. The thickening and hardening was found due to thickening of tunica vaginalis as well as tunica albuginosa. Internal structure of testis was found absolutely normal which was evident by histopathological examination of the testis.

Seminogram was also done in many cases of bilateral hydrocele about 4-6 months after sclerotherapy, which was found absolutely normal regarding morphology, motility & count of spermatoza.

Table No. 4

Patients having complications after sclerotherapy at  
3 months' follow up.

Sl.No.	Complications	No.of cases	Percentage
1.	Recurrence	27	21.62
2.	Stinging sensation in scrotum	14	11.30
3.	Testicular tenderness	10	8.3
4.	Infection	-	-
5.	Haematoma	-	-

The table No. 4 shows total recurrence rate 21.62% in study, only 11.3% had stinging sensation in scrotum probably due to leakage of sclerosant in subcutaneous tissue during injection in the sac.

No infection or haematoma was found in any case. Thickening of tunica vaginalis, epididymis & cord were found in almost 100% cases.

It was found that reaccumulation of fluid nearly almost pre-treatment size occurred in almost all the cases for 3 weeks, in majority (approx. 80%) the fluid got gradually reabsorbed spontaneously by the end of 3rd month of sclerotherapy. The final reassessment done after 4 months showed persistent reaccumulation in 21.62% cases.

The cases treated with 2.5% phenol in normal saline solution and having  $\sqrt{ } 300$  ml of hydrocele fluid required 2-3 treatments while increasing the concentration of phenol to 5% the number of recurrences & number of repeated treatment considerably fell down, as results seen in Table No. 5 & 6 respectively.

Table No. 5

Results with 2.5% solution of phenol in normal saline.

Amount of fluid	Total no. of patients	No. of patients requiring		
		One treatment	Two treatment	Three treatment
100 - 200 cc	7	6	1	Nil
200 - 300 cc	4	1	2	1
$\sqrt{ } 300$ cc	3	Nil	1	2
Total	14	7	4	3

Table No. 6

Results with 5% solution of phenol in normal saline.

Amount of fluid removed in c.c.	Total number of patients	No. of patients requiring		
		One treatment	Two treatment	Three treatment
100 - 200	26	10	Nil	Nil
200 - 300	6	5	1	Nil
300 - 400	5	2	2	1
$\sqrt{ } 400$	5	Nil	3	2
Total	26	17	6	3

Table No. 7

Showing results with 7% solution of phenol in normal saline.

Amount of fluid removed in c.c.	Total number of cases	Number of patients requiring		
		One treatment	Two treatment	Three treatment
100 - 200	26	26	Nil	Nil
200 - 300	21	14	7	Nil
300 - 400	17	12	5	Nil
400 - 600	15	5	8	2
7600	5	Nil	3	2
Total	84	57	23	4

As table No. 7 shows, with 7% concentration of phenol most patients required only one or at the most two treatments. There was no need for repeated treatments as indicated in earlier reports (Nash, Moloney). This saves patients repeated visits to the hospital and time off work. Even very large hydroceles (upto 1000 cc) have been completely cured by this method, operation not been required in any case.

## **DISCUSSION**

## D I S C U S S I O N

The present study was performed on 124 patients of primary vaginal hydrocele, who attended the surgery O.P.D. at M.L.B. Medical College, Hospital, Jhansi and were treated by sclerotherapy as an outdoor procedure.

All the patients treated, were followed up for 4 months. The patients who failed to attend the O.P.D. for follow up were sent a written questionaire. The results have been analysed by taking in consideration the answers sent by patients.

By this study it is clear that most of the patients who voluntarily adopted this form of treatment were active workers belonging to 15-35 years of age group.

Majority of the patients did not have any history of trauma inflicted over scrotum in the past as the cause of hydrocele. However 20.97% cases had definite history of trauma. Not surprisingly the large the size of hydrocele, the greater the number of injections required. However in present study even for largest hydrocele a maximum of two injections & occassionally 3 injections were required.

None of the patients reported any serious complication like haematoma, infection etc., but almost all the patients had thickening of tunica vaginalis & epididymis.

Initially few cases reported of stinging sensation at the time of phenol injection, which was later prevented by injecting a small amount of local anaesthetic (2% xylocaine injection) in the sac before injecting the phenol.

None of the patients required hospital admission due to complications & none had to take time off work. In the beginning the patients were admitted in the ward & kept for observation to see the effect of increasing concentration of carbolic acid. After standardising the effective concentration of carbolic acid at 7%, the patients were discharged immediately after sclerotherapy.

Reaccumulation of fluid to almost the pre-treatment size occurred for about 2-3 weeks. The fluid gradually reabsorbed and this process was completed by 3 months in many cases. Recurrence was not much significant (21.87%) only even after the first injection. In cases, who showed persistent reaccumulation even after 4 months, procedure was repeated and result was found to be quite satisfactory. Only 3 cases required 3 injections. The recurrence rate was however, statistically significant with diluted sclerosant.

The recurrence following first therapy could be explained by the irritating nature of phenol over the mucous membrane of tunica vaginalis. Majority of the cases had no recurrence if treated again with a slightly higher concentration usually after 16 weeks.

Majority of the cases treated by higher concentration i.e. 7% of phenol in normal saline did not show reaccumulation, though the patients complained of some pain of moderate degree for few days. These patients were supported with analgesics and scrotal support for few days.

Thus sclerotherapy is a simple, safe, effective, very acceptable procedure to the patient and without significant complications. It can be carried out as O.P.D. procedure in the hospital or at any primary health centre. Carbolic acid used as sclerosing agent is easily available. In this study, this procedure proved to be highly effective for primary hydrocele with a cure rate  $\geq$  90%. Sclerotherapy in children was be avoided for the fear of causing orchitis or testicular atrophy due to a direct action of sclerosant. This was analysed in few cases by taking the biopsy of tunica, epididymis, ductus deferens, and testis and secondly in bilateral cases by seminogram. The microscopic examination of the epididymis tunica & vas deferens showed variable degree of fibrosis, mono-nuclear infiltration, mucosal damage & haemorrhagic spots. Testis was found perfectly normal and without any structural damage. The testicular atrophy can occur only in condition when the technique of sclerosant injection is faulty i.e. it is has been injected into the testis.

JOHN HUNTER once wrote " No disease affecting the human body and requiring an operation for it's cure has called forth the opinions and pens of surgeons so much as this disease. Each finds that every mode of operating except his own has failed".

In expressing our enthusiasm for sclerotherapy as an effective mode of treatment we are well aware of these words.

This method of treatment is presented as an additional method to the surgical treatment already available.

In this study sclerotherapy was used as primary method of treatment of hydrocele and not a secondary method in rejected or unfit cases for operation. We have treated 124 cases with this method. There have not been a single case of local or systemic complications except momentary pain at the time of injection of solution, which subsides after 10-20 minutes, swelling and hardness which persists for 3-4 weeks & subsides gradually by itself.

This procedure can be done as an out patient procedure and patient can go home immediately and resume his work next day. There is no need for admission and stay in the hospital and to be out of work for 1-2 weeks as after operation. There is also no risk of post operative complications e.g. haematoma formation & infection etc.

With 7% concentration of phenol, most patients required only one or at the most two treatments. There was no need for repeated treatments as indicated in earlier, reports (Nash, Moloney). This saves patients repeated visits to the hospital and time of work. Even very large hydroceles (Upto 1000 cc) have been cured by this method, operation not being required in any case.

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## **CONCLUSION**

## SUMMARY AND CONCLUSION

A prospective study was carriedout on 124 cases of primary vaginal hydrocele, who attended the OPD of M.L.B. Medical College, Hospital, Jhansi for sclerotherapy during the period of June 1987 to May, 1988.

Phenol diluted in normal saline in varying concentrations ranging from 2.5 to 7% was used as an sclerosant.

The patients who desired sclerotherapy for hydrocele were thoroughly examined. Only those cases were selected for sclerotherapy who were found to be free of any local sepsis, without any type of associated acute/chronic epididymo-orchitis or associated malignancy.

The patients of younger age group were also excluded from this study. Patients having ipsilateral hernia, and thickened cord were also excluded from study.

The final case selection was assessed by eliciting translucency, fluctuation, tenderness etc. The merits & demerits of this procedure of treatment were explained to the patients. The patients were warned that some fluid might reaccumulate and for which repetition of treatment might be required. The patients were asked to come for follow up upto 6 months.

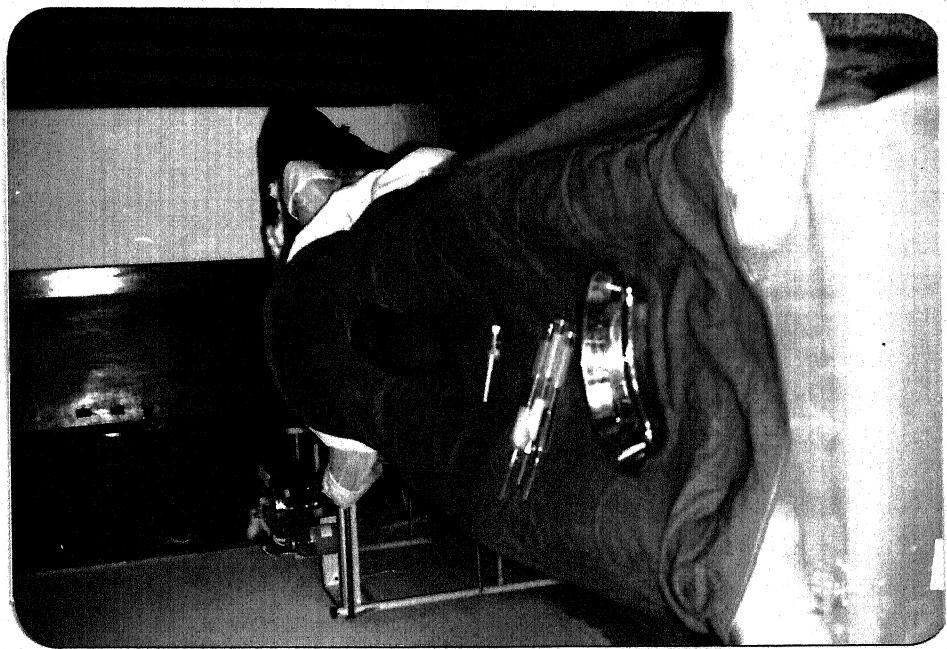
In this study none of the patients had any serious complication. Only few of them complained of testicular ache for few days & some residual thickening of tunica vaginalis & epididymis.

None of the patients required hospital admission for any sort of complication & none have had time off work.

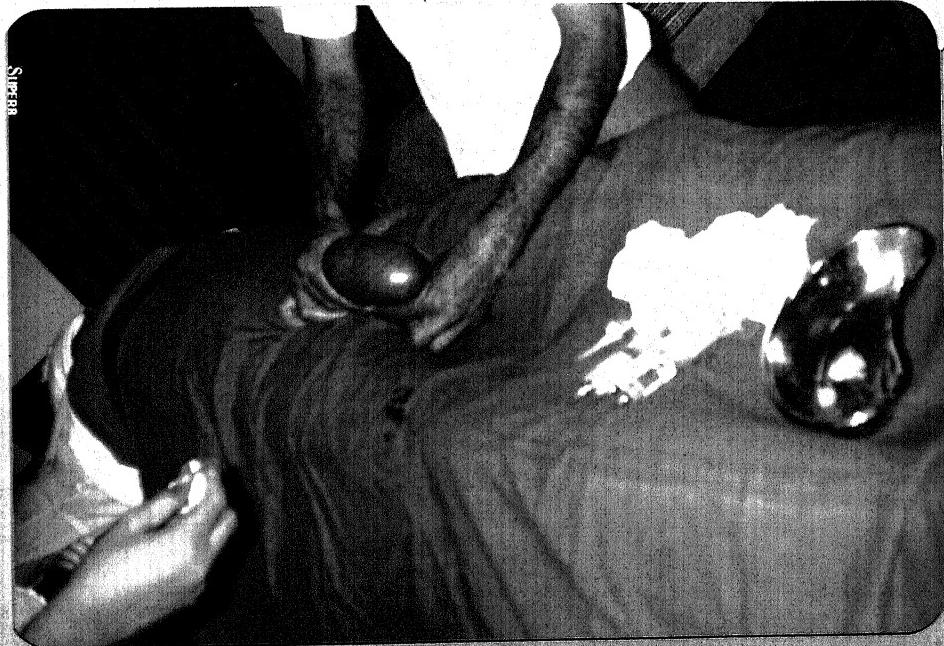
The sclerotherapy did not have any adverse effect on spermatogenesis which was evident by semen analysis of few patients with bilateral hydrocele & by testicular biopsy.

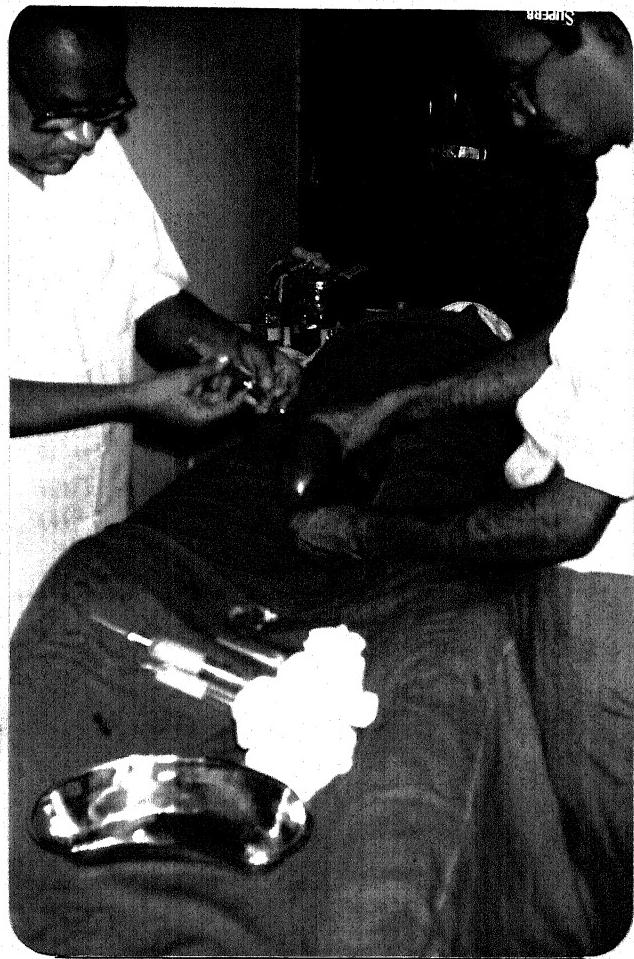
The biopsy taken from tunica vaginalis, ductus deferens, and epididymis showed some degree of fibrosis & inflammatory reaction like infiltration of mononuclear cells.

However clinically the efficacy of sclerotherapy was evident. Sclerotherapy is a very simple, safe and effective O.P.D. procedure, which is well acceptable to the patients and without any serious complications irrespective of the age of the patient and the size of hydrocele.

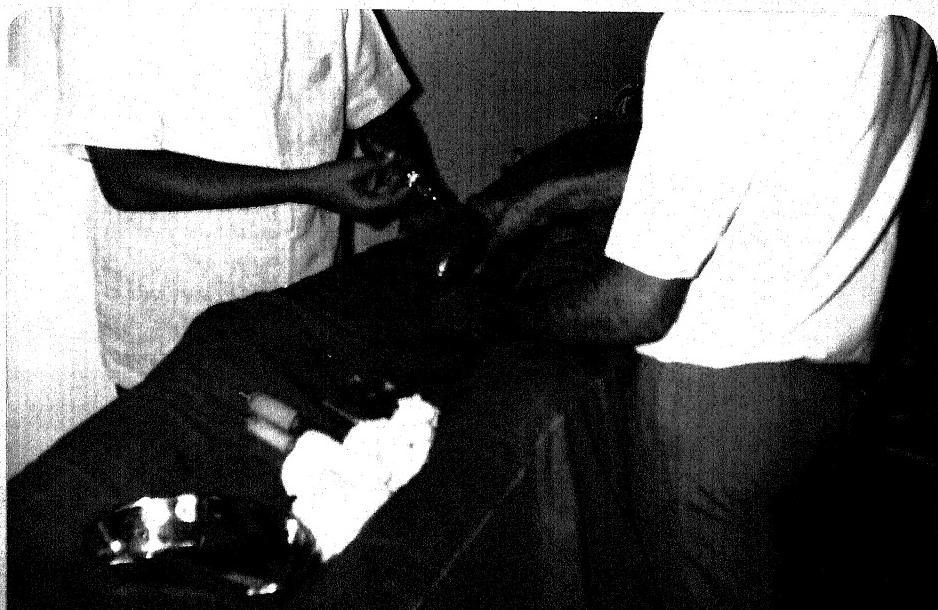


PHOTOGRAPH NO. 1 : SHOWING PAINTING & DRAPING OF PART





PHOTOGRAPH NO. 3(a,b): SHOWING INJECTION OF LOCAL ANAESTHESIA  
AT UPPER END OF HYDROCELE

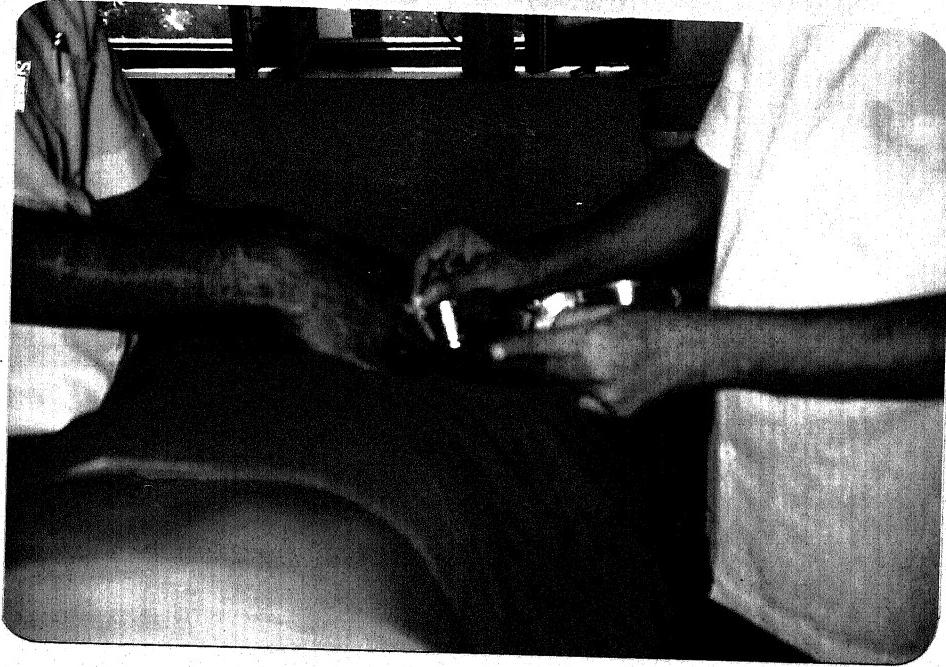




PHOTOGRAPH NO. 4 : SHOWING INSERTION OF VENEFLOAN CANNUL  
IN THE SAC.



PHOTOGRAPH NO. 5 : SHOWING VENEFLOAN CANULA IN POSITION



PHOTOGRAPH NO. 6 : SHOWING COLLECTION OF HYDROCELE FLUID  
IN KIDNEY TRAY



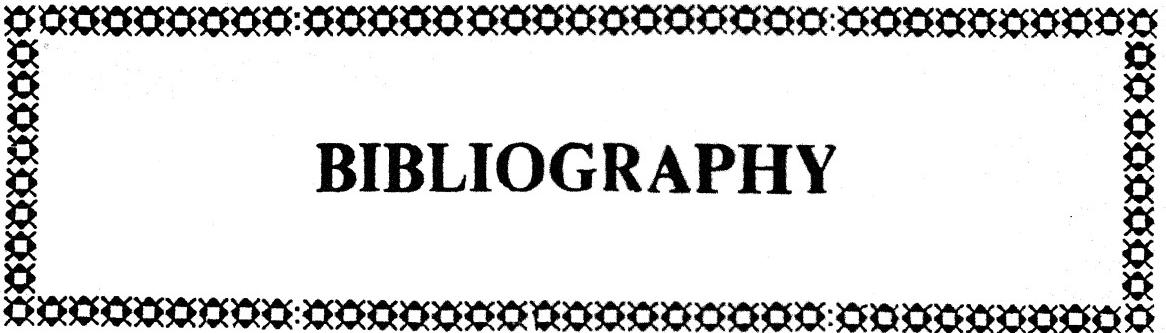
PHOTOGRAPH NO. 7 : SHOWING COMPLETE EMPTYING OF SAC



PHOTOGRAPH NO. 8 : SHOWING INJECTION OF SCLEROSENT FLUID  
IN THE EMPTY SAC.



PHOTOGRAPH NO. 9 : SHOWING DRESSING OF PART AFTER SCLEROTHERAPY



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200